## Remarks

The Applicants have amended Claim 13 to recite that the amount of precipitated W is 0.005% to 0.1%. Support may be found in the Applicants' specification such as in paragraph [0023] at lines 6-10. Entry of the above changes into the official file is respectfully requested inasmuch as the claimed range is inherently encompassed by the earlier considered and searched range.

Claims 13-17, 20 and 21 stand rejected under 35 USC §103 as being obvious over Kawabata. The Applicants note with appreciation the Examiner's detailed comments hypothetically applying Kawabata against those claims. The Applicants respectfully submit, however, that the subject matter of those claims is anything but obvious over the Kawabata disclosure. Details follow.

The Applicants respectfully submit that they have already factually demonstrated significant differences between Kawabata and the claimed subject matter. However, given the additional changes to the range in precipitated W as set forth above, the Applicants provide additional comments, additional proof and three figures that demonstrate the unexpected results achieved by the Applicants.

W is not an indispensable element according to Kawabata. In sharp contrast, W is an indispensible element to the Applicants as recited in Claim 13. W is merely an optional element in Kawabata and, out of 101 examples in Kawabata, there is only one example (No. 86 in Table 4) which contains W. However, the amount (W: 1.5%) is still far outside the range of W content (2.05 to 6.0%) specified by Claim 13.

Kawabata relates, as discussed in the Background Art section and in col. 1 at lines 50 to 57, to stainless steel sheets used as building materials, materials for automobiles, materials for chemical plants and so forth and also relates to a process for the production of stainless steel sheets containing extremely low amounts of C, S and O, in particular, having improved corrosion resistance compared to the conventional steel sheets without trimming the surface of the steel sheet after annealing-pickling.

On the other hand, the Applicants disclose and claim, as discussed in their specification on page 1 in paragraph [0001] under the heading Technical Field, "the present invention relates to ferritic Cr-contained steel having a low thermal expansion coefficient, and particularly relates to ferritic Cr-contained steel having a low thermal expansion coefficient suitable for applications in which a heat cycle is repeated between high temperature and low temperature, including exhaust

system members of an automobile such as exhaust manifolds, exhaust pipes, converter case materials, and metal honeycomb materials; separators within a solid-oxide-type fuel cell; materials for interconnectors; materials for reformers as peripheral members of fuel cells; exhaust ducts of power generation plants; or heat exchangers." Paragraph [0038] also teaches an amount of precipitated W of 0.005% to 0.1%. To achieve the effect of low expansion coefficient, there is specified a hot-rolled sheet annealing temperature to 950 to 1150°C (more preferably 1020 to 1150°C) and a finish annealing temperature to 1020°C to 1200°C (more preferably 1050°C to 1200°C). In sharp contrast, Kawabata merely teaches annealing in a manner according to ordinary methods. Hence, no concrete annealing temperature is disclosed. Also, in Kawabata, there is no disclosure about the relationship between the amount of precipitated W and the thermal expansion coefficient. This is a necessary condition specifically recited in the Applicants' Claim 13.

As noted above and as proof of the foregoing, according to Kawabata, W is an optionally added element in col. 9 at lines 15 to 24 and, out of 101 examples, there is only one example (No. 86 in Table 4) which contains W and the value (W: 1.5%). It is outside the Applicants' claimed range of W (2.05 to 6.0%). The attached Fig. A comprises the Applicants' Fig. 1 to which data of examples in the Applicants' specification is further added. The amounts of added W are 2 to 6% and the amounts of the precipitated W are in the Applicants' claimed range of 0.005 to 0.1% (range in blue).

By controlling the amounts of added W and precipitated W so that the amounts will be within the blue range, it is possible to achieve an average thermal expansion coefficient of less than $12.6 \times 10^{-6}$ at a temperature between 20°C and 800°C. This is completely unexpected from Kawabata. Therefore, even assuming that the amount of precipitated W of an example (No. 86 in Table 4) is 0.01%, this is still outside the Applicants' range in Claim 13 as shown in attached Fig. A.

Attached Fig. B is similar to attached Fig. A and includes data of precipitated W<=0.01% plotted and shows that when the amount of added W is 2% or more, there is obtained an average thermal expansion coefficient of less than $12.6 \times 10^{-6}$ at a temperature between 20°C and 800°C. In other words, it is understood that an average thermal expansion coefficient of less than $12.6 \times 10^{-6}$ at a temperature between 20°C and 800°C can hardly be obtained with steel (No. 86 in Table 4) of the examples of Kawabata.

In addition, attached Fig. C is similar to attached Fig. A wherein data of added W=about 3% is plotted and there is shown that when the amount of precipitated W is 0.1% or less, there is obtained an average thermal expansion coefficient of less than $12.6x10^{-6}$ at a temperature between 20°C and 800°C. The aforesaid effect was not known and is completely unexpected.

Thus, the Applicants respectfully submit that Kawabata fails to teach, disclose or suggest the subject matter as recited in Claim 13. Moreover, the Applicants respectfully submit that they have established unexpected results based on the amount of precipitated W versus the obtained average thermal expansion coefficient. Withdrawal of the rejection on this basis alone is respectfully requested. However, there is more.

The Applicants' specification in paragraphs [0037] to [0038] teaches that it is important to have precipitated W at 0.005% to 0.1%. To achieve this, it is of great importance to specify a hot-rolled sheet annealing temperature and a finish annealing temperature, particularly the finish annealing temperature. The Applicants' specification in paragraphs [0004] to [0005] discloses that W precipitates in the form of the Laves phase and a temperature at which precipitation most rapidly occurs is centered around 700°C (cf. Literature: Fig. 5, No. 8, Vol. 65 (1979), Iron and Steel, Sawatani, et al.). To suppress precipitation in hot-rolled sheet annealing, the annealing must be conducted at 950°C or more. Nevertheless, even when annealing is performed at a temperature of 950°C or more, because of passing through a precipitation temperature in the cooling process and, further, due to the large plate thickness, it is impossible to obtain a sufficient cooling rate thereby precipitation in a form of the Laves phase occurs as a logical consequence.

On the other hand, Kawabata discloses in col. 6 at line 67 an annealing temperature in a temperature range as wide as 700 to 1300°C. However, precipitated W is simply not controlled. Also, in the examples of Kawabata, three types of hot-rolled sheet annealing, namely, at 1150°C for 1 minute, 1000°C for 1 minute and 850°C for 5 hours, were performed as discussed in col. 10 at lines 41 to 52. However, when annealing is conducted at 850°C for 5 hours, precipitation in the form of the Laves phase occurs conspicuously and re-melting by subsequent cold-rolled sheet annealing becomes impossible.

In sharp contrast, as recited in Claim 13, W is inevitably precipitated by hot-rolled sheet annealing and re-melted by controlling the cold-rolled sheet annealing conditions. To achieve the foregoing, a condition which is different from ordinary methods needs to be selected. Further, in a

cooling process of cold-rolled sheet annealing, passing through a region of precipitation temperature is inevitable as in the case of hot-rolled sheet annealing. Nonetheless, because the sheet thickness of a cold-rolled sheet is small and the necessary time for passing through the precipitation temperature region is limited to a short period of time, precipitation of W does not occur conspicuously.

As noted above, according to Claim 13, it is made possible by controlling the length of cold-rolled sheet annealing time, that W, inevitably precipitated by hot-rolled sheet annealing, is re-melted and disappears. This suppresses the amount of the precipitated W to a low level. In Kawabata, control of the amount of precipitated W to 0.005% to 0.1% is not disclosed, taught or suggested. The Applicants therefore respectfully submit that one skilled in the art would not and could not obtain the Applicants' claimed subject matter based on the flawed teachings of Kawabata. Withdrawal of the rejection is accordingly respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,

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